BLACK BOX®
NETWORK SERVICES

Cooling Solutions

Reduce power and cooling costs and protect mission-critical equipment with the latest in thermal management.

Cold Row™
Rack-Based

Cold Front™
Passive Liquid

ClimateCab™
Self-Contained

Elite™ Cabinets
Fully Configurable

888-433-5049 | blackbox.com/go/Cooling

Rely on the experts at Black Box for your data center cooling needs.

Cold Front™

Cold Front Passive Liquid Cooling is the perfect solution for **high-density enclosures.** It works to sensibly cool a data center enclosure — and can lower data center operating costs by as much as 50% because it reduces both energy and space requirements. Pages 2–5.

Cold Row™

Cold Row Efficient Rack Cooling is designed for scalability, reliability, and seamless integration into **new or existing data centers**. The system is suitable for use in **open and contained hot aisle and cold aisle configurations**. Cold Row is also ideal for hot spot cooling in small- to enterprise-size data centers. Pages 6–9.

ClimateCab™

Save by cooling only the cabinet with ClimateCab, not the entire room. Ideal for indoor use **when you need to keep your servers outside a climate-controlled data center**. Pages 10–11.

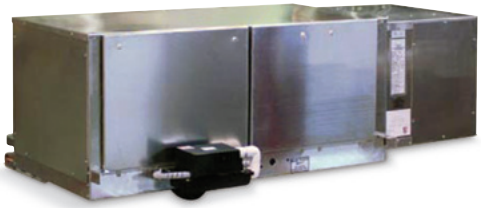
We have appropriate solutions for every application.

Elite™ Cabinets

Elite Cabinets with Cooling Accessories are robust cabinets for **any application**. Add accessories like a chimney top, air dams, or an aisle containment system to improve cooling. Pages 12–19.

Ceiling-Mounted Air Conditioners

Ceiling-Mounted Supplemental Air Conditioners include self-contained and split systems, plus ducted and ductless systems, from 1 to 10 tons. **For areas with limited floor space.** Page 20.

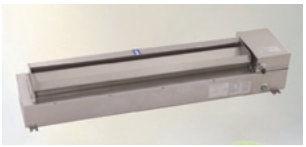


Small CRAC Units

Floor-mounted precision air conditioners from 1 to 7 tons. **Perfect for small server rooms or supplemental cooling.** Page 21.

Ultrasonic Humidifiers

Energy-Efficient Ultrasonic Humidifiers use 93% less electrical energy than electrode boilers or infrared humidifiers. No heat is added to the conditioned space, but instead, the ultrasonic adiabatic humidification process produces a cooling effect that helps reduce compressor run time. Page 21.



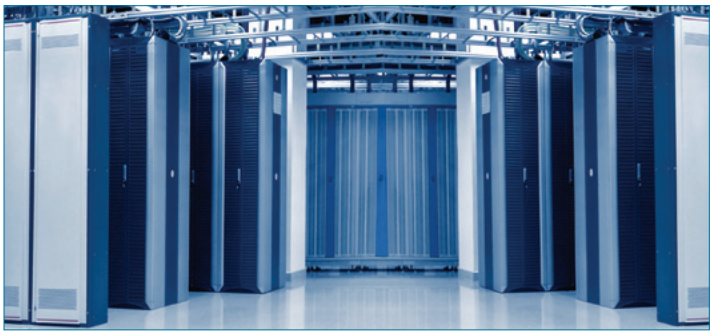
We'll help you find the right solution:

FREE, Live, 24/7 Tech Support

Talk with an expert in 30 seconds or less at **724-746-5500** or go to **blackbox.com**.

Contact us today for a complimentary data center assessment.

Passive liquid cooling for your data center.



- Heat-Transfer Doors use liquid to neutralize heat at the source.
- Coolant Management System intelligently moves liquid through Heat-Transfer Doors.
- Supports five times the computing power of air-cooled facilities.
- Installs easily and requires no rearrangement of your enclosure.
- Saves on energy bills. Reduces energy consumption of indoor cooling units by 90% or more!
- Neutralizes heat at the source, returning cooled air into the data center and providing up to 33 kW of cooling per cabinet.
- Eliminates the need for hot-aisle/cold-aisle configurations—place your computing equipment where you want it.

Nothing cools like chilled water. Now you can harness the cooling power of liquid in your data center with Cold Front™.

Cold Front is the perfect solution for tightly packed server rooms or high-density enclosures. It works to sensibly cool a data center enclosure—and can lower data center total cost of ownership by as much as 50% because it reduces both energy and space requirements.

Heat-Transfer Door

The Heat-Transfer Door (HTD) neutralizes heat at the source. Chilled liquid passing through the door cools the exhaust air before it re-enters the data center. It requires no fans or electricity because it uses the server fans to move the hot air through the door.

The door uses a closed-loop circulatory system, and its specially designed perforations and coil maintain airflow through the cabinet.

Because the Heat-Transfer Door features a passive design with no moving parts, it increases efficiency and reduces noise.

The door replaces the existing rear door and installs easily, requiring little if any regular maintenance. Plus, it can be installed without the need for pressurized raised floors, air plenums, or exhaust chimneys. It also eliminates secondary pump systems for condensate.

Choose from top- or bottom-feed versions, as well as models that support 100% neutralization (maximum) of the heat load for 24–33 kW of cooling capacity*. The door works with most enclosures and can be ordered for many standard cabinet sizes.†

Use the door with our Coolant Management System for consistent data center cooling that grows as your computing capacity increases.

Coolant Management System

The advanced Coolant Management System (CMS) works with enclosure-mounted Heat-Transfer Doors (**below left**) to keep data center equipment running cool and lower your overall energy consumption.

On a primary loop, it attaches to your chilled water system or a dedicated chiller. On its secondary loop, the system connects to the Heat-Transfer Doors, providing up to 20 or 260 kW of cooling capacity, depending on the model.

* Maximum cooling capacities are for 100% neutralization of heat load using ASHRAE allowable conditions: EWT @ 55° F (13° C); flow rate @ 12 GPM (45 LPM); EAT to the rack @ 90° F (32° C); 2500 CFM; dew point @ 54° F (10° C) or lower.

† Compatible with Black Box® Elite™ cabinets and most other major cabinet brands, including APC®, Rittal®, HP®, CPI®, and others.

The system maintains the isolated secondary loop supply temperature above the dew point of the data center, preventing condensation and ensuring 100% sensible cooling.

The system does this by monitoring the temperature and pressure conditions and increases and decreases in flow as conditions change in your data center. Heat removed by connected Heat-Transfer Doors is then ejected to the chilled water supply by using a stainless steel plate heat exchanger.

What's more, the system's controller provides intelligent monitoring, interfacing with building management systems and Web management tools for high reliability.

The versatile Coolant Management System features redundant variable speed pumps, actuators, and control valves to maximize system availability.

The system is available in two base versions:

- A floor-mount model that boasts up to 260 kW of cooling capacity, supports up to 48 Heat-Transfer Doors, is easy to install and maintain, and can be placed next to your IT enclosures or outside of the white space entirely.
- A smaller, 6U-high rackmount system that supports up to 20 kW of cooling capacity and provides a cost-effective way to support one or two Heat-Transfer Doors.

Cold Front Total Cost of Ownership:

Total Cost of Ownership (TCO)

The average operating cost of data centers has grown three times faster than capital investment in new IT equipment. Factors for uncontrolled TCO include cooling equipment capital expense, inefficient designs, high installation costs, rising energy bills, and ongoing maintenance. So, how can you add value while meeting your cooling challenges?

Scalable

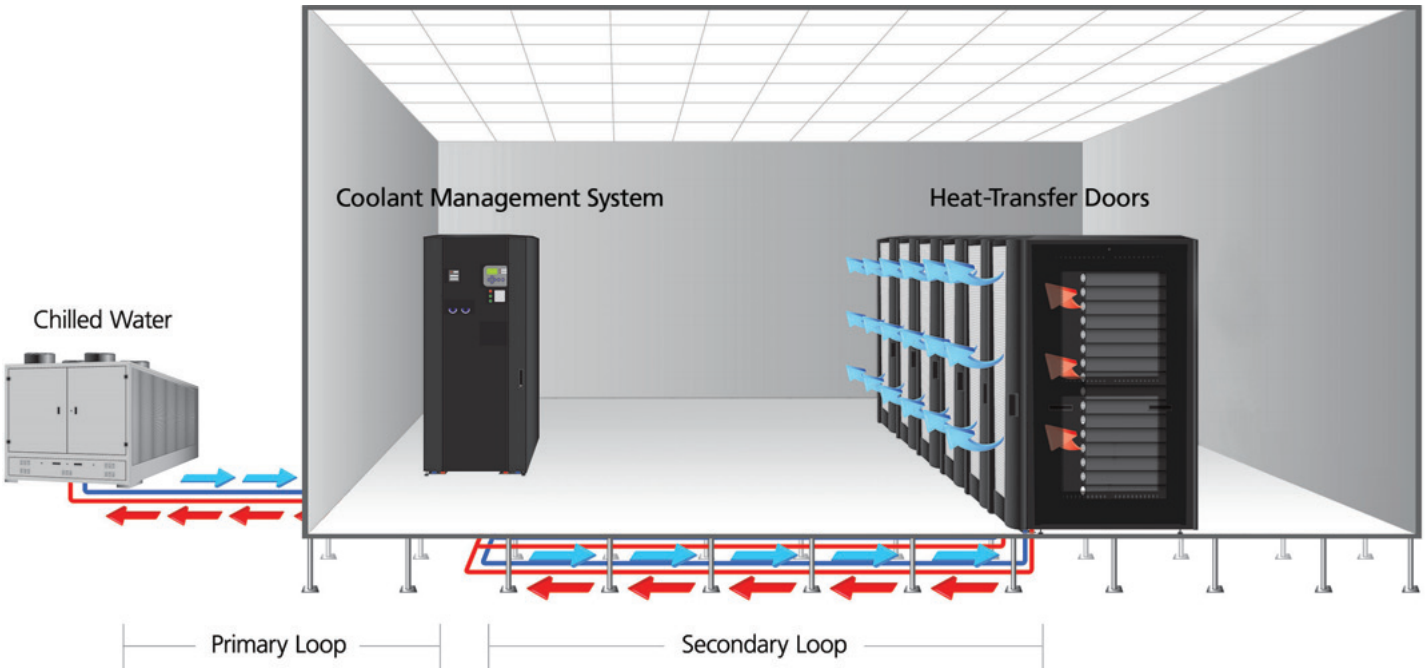
In typical data center installations, the infrastructure required to support perimeter or in-row cooling must be built in on Day One. Because the Cold Front™ solution can be installed quickly and easily and requires no pressurized raised floors, air plenums, exhaust chimneys, etc., you can build as you grow. Add units as you add computing. Don't pay for infrastructure that you don't need.

Reliable

With no moving parts, the Cold Front door requires little if any regular maintenance. In fact, we are so sure of the reliability of the Cold Front Heat-Transfer Door, it comes with a three-year limited warranty.

Predictable

The Cold Front cooling solution uses a closed-loop circulatory system and connects to a Coolant Management System (CMS) that monitors the temperature and pressure conditions, increasing and decreasing flow as conditions change in the data center. This approach offers data centers consistent and scalable cooling to meet their changing demands.

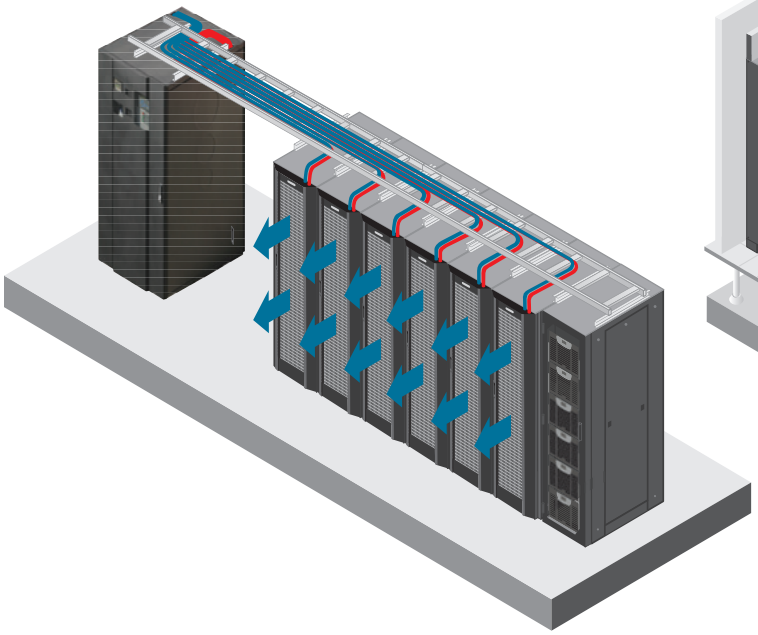


Coolant Management System | Specifications

	Rackmount CMS	Floormount CMS
Maximum Cooling Capacity	20 kW	260 kW (887,400 BTU/hr., 74 tons)[2]
Coolant Type	Chilled Water	Chilled Water
Physical Configuration	Rackmount	Floormount
Design Pump Capacity	10.6 GPM	95 GPM
Available External Head Pressure @ Design Flow	29 psi	28.6 psi
Primary Pressure Drop	7.2 psi @ 10.6 GPM	36.3 psi @ 95 GPM
Primary Connection Type and Material	3/4" BSP Flat Face, Copper	54 mm/2" Sweat, Copper Tails
Primary Connection Orientation	Rear	Bottom Standard (Top Optional)
Secondary Connection Type and Material	ISO 7241-1 Series B Self-Sealing 3/4" Quick Connects	54 mm/2" Flex Tails or Internal Manifold Using Eight (8) 3/4" NPT or Six (6) 1" NPT
Secondary Loop Coolant Volume	0.9 Gallons (3.5 L)	14.7 Gallons (55.4 L)
Secondary Connection Orientation	Rear	Bottom Standard (Top Optional)
Approach Temperature at 100% Load	13.1˚ F (7.3˚ C)	10.6˚ F (5.9˚ C)
Number of HTDs Supported	1–2	Up to 48
Dew Point Control	Yes	Yes
Redundant Variable Speed Pumps	No	Yes
Power Supply	208 V, 1Ø, 60 Hz or 230 V, 1Ø, 50 Hz	208-230 V, 3Ø, 50/60 Hz or 380-480 V, 3Ø, 50/60 Hz or 480 V, 3Ø, 60 Hz or 400 V, 3Ø, 50 Hz
Typical Power Consumption	690 W at 230 V	3.7 kW at 480 V
Noise Level at 3 Meters	<55 dBA	<55 dBA
Size (H x W x D)	10.5" (6U) x 19" x 28.7" (27 x 48 x 73 cm)	74.2" (37U) x 23.6" x 39.3" (189 x 60 x 100 cm)
Dry Weight: Rackmount	101 lb. (46 kg)	N/A
Dry Weight: Floormount with Flex Tails	N/A	662 lb. (300 kg)
Filled Weight: Floormount	N/A	814 lb. (370 kg)

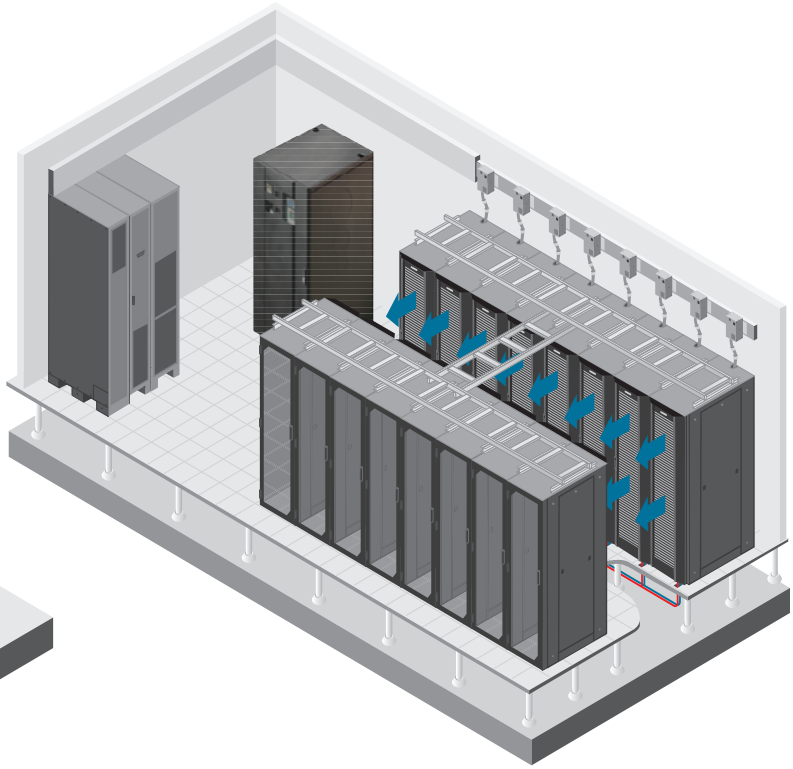
NOTE: Compatible with Black Box® Elite™ cabinets and most other major cabinet brands, including APC®, Rittal®, HP®, CPI®, and others.

Data Center Medium-Cabinet-Density Solution

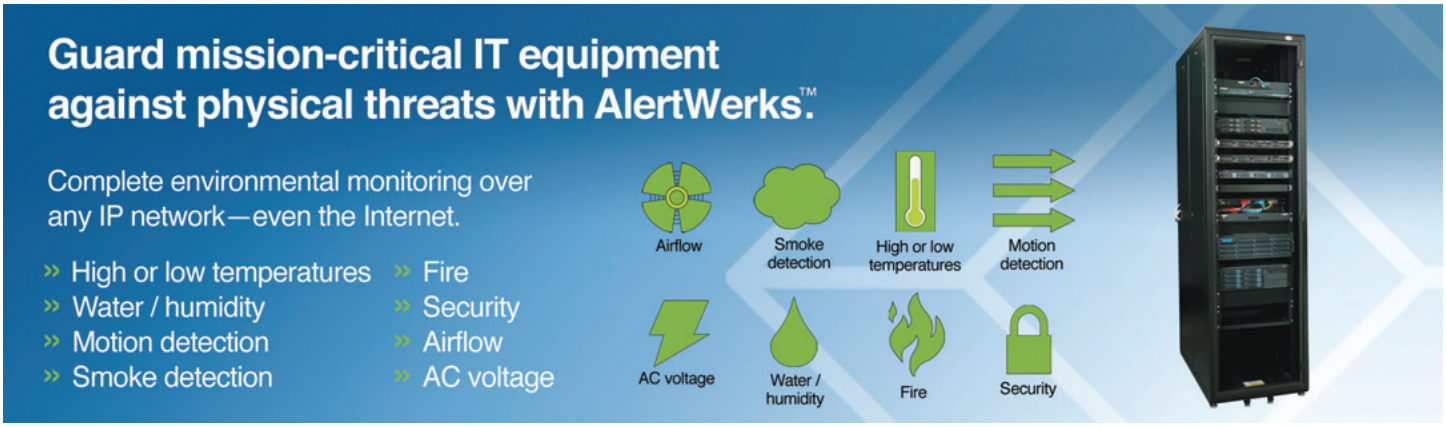


In this scenario, Cold Front is providing 60-kW of cooling capacity across six cabinets. There is a 260-kW Coolant Management System (CMS) paired with a row of six Heat-Transfer Doors (HTDs) providing 10 kW of cooling capacity per cabinet. This model is completely scalable, allowing you to continue to add cabinets to the configuration with HTDs until the 260 kW is reached. This environment does not contain a raised floor, but uses top-feed HTD and overhead hose routing.

Data Center High-Cabinet-Density Solution



This is a very-high-density environment of 15+ kW per cabinet. The CMS is providing 260 kW of cooling capacity to HTDs on the cabinets in the data center. The raised-floor environment uses bottom feed HTDs and under-floor hose routing. This solution can be scaled by adding additional CMS units and HTDs.



An innovative, economical, energy-efficient data center cooling solution.

Designed for scalability, reliability, and seamless integration into new or existing data centers, Black Box® Cold Row™ rack cooling systems are suitable for use in open and contained hot aisle and cold aisle configurations. Cold Row is ideal for hot spot cooling in small- to enterprise-size data centers.

- Front discharge for hot aisle or cold aisle capture.
- Side discharge for open aisle configurations.
- Designed for installation on raised floor or slab floor applications.
- Suitable for new and existing data centers.
- Choose from chilled water and direct-expansion (air, water, or glycol) models.
- Wide range of cooling capacities for small, medium, and even the largest applications.
- Top and bottom pipe and power connections.
- 100% front and rear service access.
- Highest cooling capacities in the industry—up to 75 kW per unit.
- Adapts to most major manufacturers' racks and rack capture systems.
- Controller links up to 8 units without a BMS.
- Seamless integration with most BMS platforms.
- Fully adjustable fan speed control for energy savings.
- Built-in redundancy.
- Capacity-assist functionality saves energy and operating expenses.
- Scalability—add Black Box Cold Row cooling units as your data center grows.
- Single- and three-phase voltages available.
- Casters included.

Cold Row | Equipment Specifications

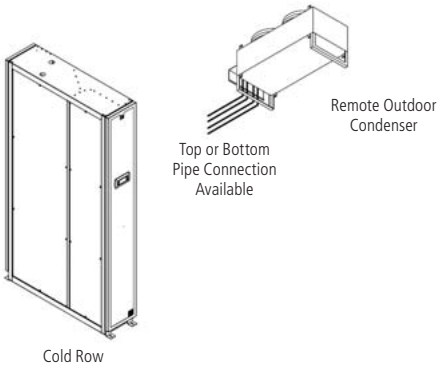
	Cold Row 12"	Cold Row 24"
Airflow, CFM	2900	5800
Coil Rows / Face Area, sq. ft.	4 / 5.8	4 / 11.6
Fan Quantity / Type	3 Backward Curved, Direct-Drive EC Fans	
Maximum Fan Horsepower	1	4
Size	78.4"H x 11.6"W x 42.1"D (199.1 x 29.4 x 106.9 cm)	78.4"H x 23.4"W x 42.1"D (199.1 x 59.4 x 106.9 cm)

Direct-expansion-type (DX) units cool air in the space with a condenser-based system using green R410A refrigerant and either air, water, or glycol. Water is supplied by the building water plant, and heat is rejected to the outdoor environment via air-cooled condensers for air-cooled units, the water tower for water-cooled units, or fluid coolers for glycol-cooled units.

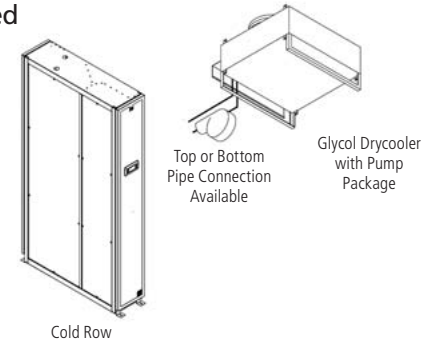
Cold Row DX Features

- Highest cooling capacities in the industry.
- 3 EC fans: Independently, infinitely adjustable EC fans ensure maximum efficiency.
- Highly efficient cold aisle or hot aisle containment systems can be implemented.
- Ideal for data centers with or without raised floors.
- Use in low- and high-density areas.
- Wide range of cooling capacities available.
- 100% front and rear service access.
- Adapts to fit most rack manufacturers—usable in any data center.
- The local area network links up to 8 units without a BMS.
- Seamless integration with all BMS platforms.
- High airflow with less noise.
- Electronic expansion valve: finely controls the cooling capacity within a few seconds.
- R410A refrigerant is efficient and green.

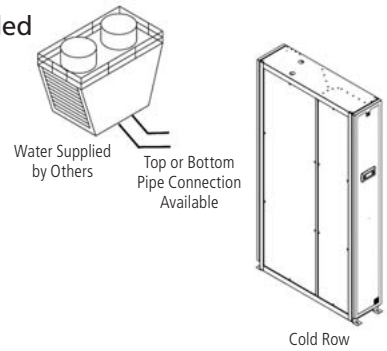
Air Cooled

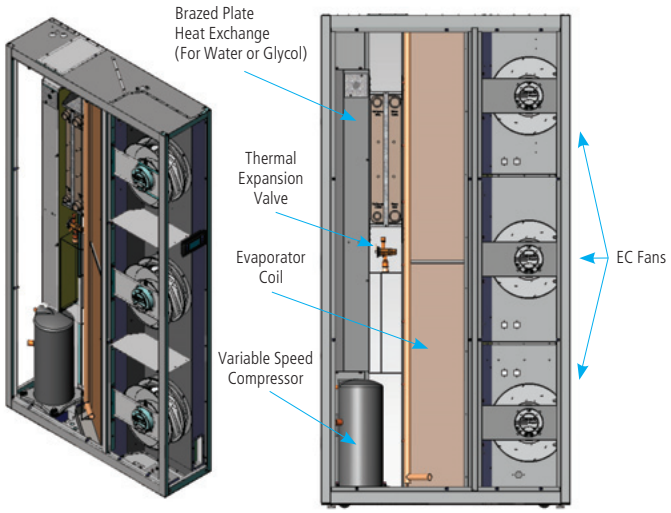


Glycol Cooled



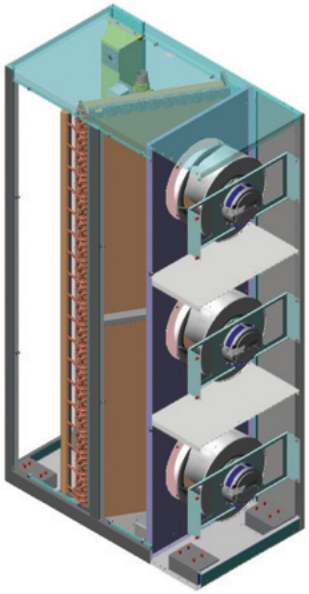
Water Cooled

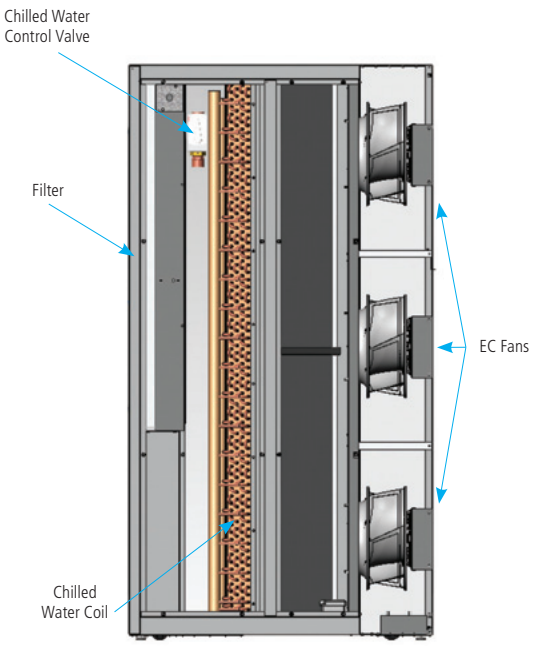




Cold Row and Chilled Water

Chilled water (CW) is supplied to the Cold Row™ unit via a building chiller or other chilled water plant. Chilled water has a high affinity for heat, thus making it a very efficient cooling method. The Black Box controller allows for independent valve and fan control so the unit can adjust immediately, and precisely, to varying heat loads. This optimizes energy efficiency.

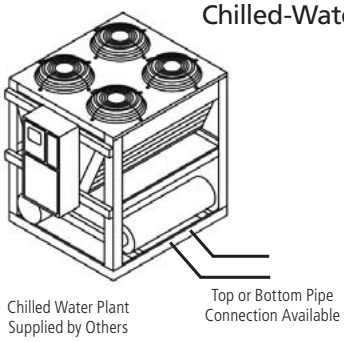


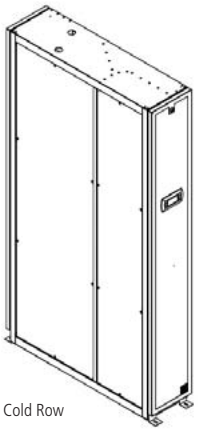


Cold Row CW Features

- Highest cooling capacities in the industry.
- 3 EC fans: Independently, infinitely adjustable EC fans ensure maximum efficiency.
- Highly efficient cold aisle or hot aisle containment systems can be implemented.
- Ideal for data centers with or without raised floors.
- Use in low- and high-density areas.
- Wide range of cooling capacities available.
- 100% front and rear service access.
- Adapts to fit most rack manufacturers—usable in any data center.
- The local area network links up to 8 units without a BMS.
- Seamless integration with most BMS platforms.
- High airflow with less noise.

Chilled-Water Cooled



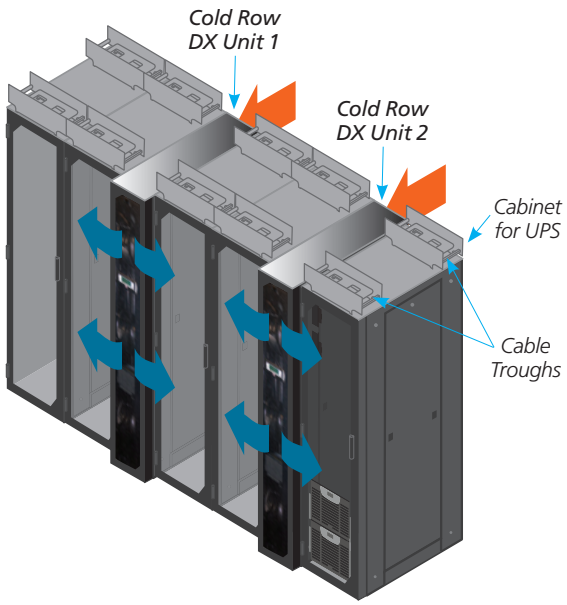


Cold Row Preconfigured Solutions

Black Box preconfigured solutions provide everything you need for your server room or data center. Our packages include cooling, cabinets and accessories; UPSs and PDUs; and environmental monitoring that fits your application.

Below are examples of our preconfigured solutions. Contact Black Box today to learn more about how our preconfigured solutions can meet your needs.

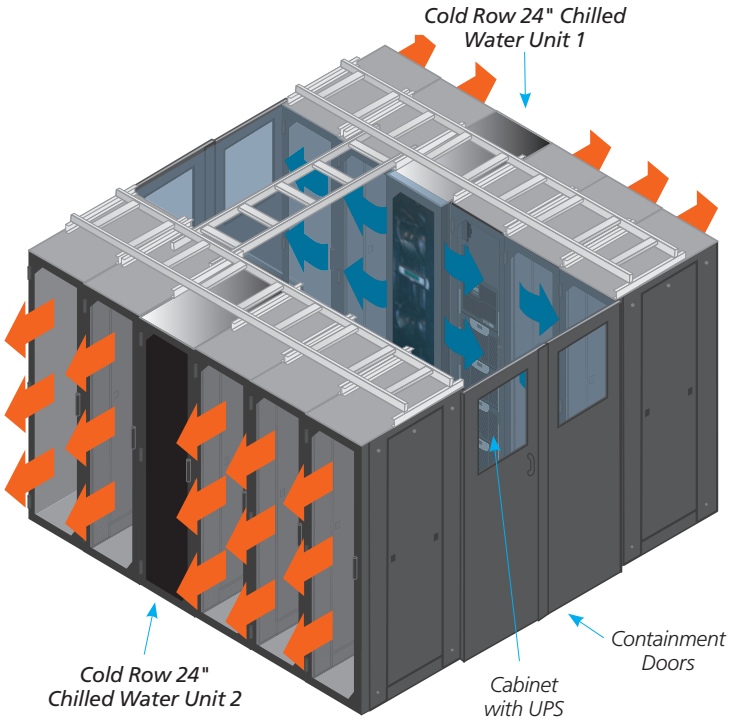
Server Room/Low Cabinet-Density Solution



This is an example of a small server room using two (2) Cold Row DX units for cooling four (4) data cabinets as well as a UPS. The cabinets are low density, with approximately 5 kW of load, and this solution provides N+1 cooling. In this scenario, side discharge units are used to ensure proper flow of the cool air to the cabinets. This solution can easily scale. As densities increase, additional Cold Row units can be added, as well as containment doors and/or ceilings.

Data Center/Low Cabinet-Density Solution (2N)

Cold aisle containment (5 kW per rack) with redundant cooling (2N) and N+1 power.



This is an example of a data center with nine (9) data cabinets as well as a UPS. In this scenario, two (2) Cold Row Chilled Water units are used along with containment doors and a containment ceiling. This provides enough cooling capacity for 2N cooling for the data center.

Black Box Explains

Redundancy in data center cooling systems.

Redundant systems are critical in data centers to ensure that service interruptions don't cause downtime during utility outages or other failures such as those at uninterruptible power supplies (UPSs) or power distribution units (PDUs), for example. Two types of redundant power systems are N+1 and 2N.

N+1 systems (also called parallel redundancy) feature redundant equipment, so if any single component (N) fails, there is at least one independent backup (+1). But common circuitry or feeds means that an N+1 system will fail at some point, and service will be interrupted. These systems are widely used in data centers, but their weaknesses can cost businesses a good deal of money and uptime.

2N (or N+N) redundant power systems are designed with two completely separate systems, with no single points of failure, and therefore deliver a higher level of data center uptime. Every important system is backed up, including power, cooling, and telecommunications.

Save by cooling only the cabinet, not the entire room.

- Ideal for indoor use when you need to keep your servers outside a climate-controlled data center.
- Digitally controlled air conditioners are available in 5000, 8000, and 12,000 BTUs (1465, 2344, and 3516 W) and in 120V or 230V (other models available upon request).
- NEMA 12 rated for protection against falling dirt; circulating dust, lint, and debris; and dripping or splashing liquids in indoor environments.
- Fully gasketed openings, including a gland plate in the base, help to protect your devices from dust and other contaminants.
- PLEXI-GLAS® window in front door.
- Fully welded 12-gauge steel frame holds up to 1500 pounds (680 kg).
- Three-point locking handles on front and rear doors.
- Feature standard 19" rails.
- Include casters and levelers for easy placement.
- Rack angles are adjustable front to rear.

The ClimateCab™ NEMA 12 Cabinet is your answer when you need to house servers or IT equipment but don't have a cooling infrastructure in place. In smaller installations, you can save thousands by using a ClimateCab cabinet instead of installing a complete data center with a custom cooling system and raised floors.

ClimateCab is sealed against dripping water and dust, too. Sealed cable entries prevent air exchange. The digitally controlled air-conditioning unit (included) keeps your equipment comfortably cool. Just install your equipment, plug in the AC unit, and you have a complete, self-contained, self-supporting data center!

NEMA 12

CC24U5000M640: left: front view; right: rear view.

CC42U5000T: left: front view; right: rear view.

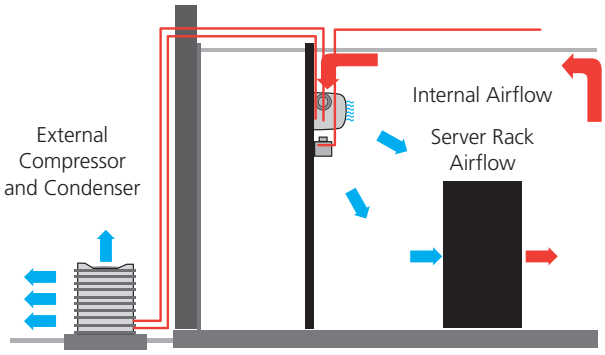
Included AC unit mounts on the side of the ClimateCab cabinet. Installation takes about five minutes.

The air-conditioning unit helps to control the temperature inside your ClimateCab by removing the heat buildup created by hot network devices. This unit uses closed-loop cooling in which the clean air inside the cabinet is kept separate from the ambient air to protect delicate components from humidity, dust, and other contaminants.

The AC mounts in the side of the cabinet in minutes with eight bolts and can easily be installed by one or two people. Mounting hardware, gaskets, and instructions are included.

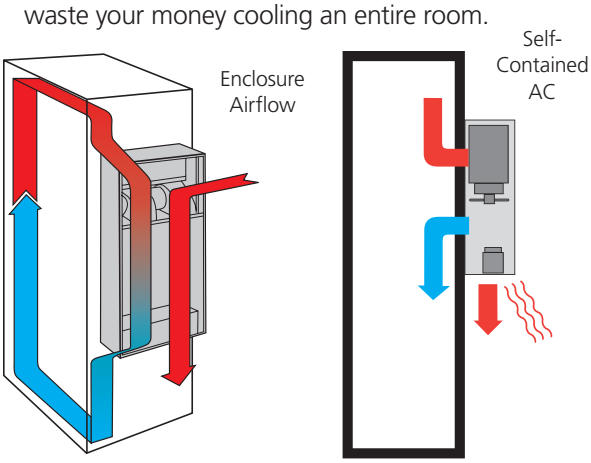
Without ClimateCab

- Compressor, air handler, and pump all require dedicated electrical circuits.
- Piping and wiring installation can be disruptive.
- Air conditioners need a drain for condensate.
- Project can take weeks to implement and can require contractors.
- Inefficient cooling wastes money.



With ClimateCab

- Cooling equipment is simple.
- Put the cabinet where you want it and plug it in.
- No need for piping, wiring, or a drain.
- ClimateCab is efficient, self-contained cooling that doesn't waste your money cooling an entire room.



What's included

- ClimateCab NEMA 12 Cabinet with M6 or Tapped Rails
- 5000-, 8000-, or 12,000-BTU air-conditioning unit
- Hardware to mount the AC to the cabinet ([8] mounting bolts, [8] steel washers, and a gasket kit) and Instructions

Buyer's Guide | ClimateCab Kits

Size	Depth (inches)	Rail Type	AC Size (BTU)	Power (V)	Code
24U	31.5	M6	5000	120	CC24U5000M631
	40	M6	5000	120	CC24U5000M640
	40	M6	5000	230	CC24U5000M640-23
	31.5	M6	5000	230	CC24U5000M631-23
	31.5	M6	8000	120	CC24U8000M631
	40	M6	8000	120	CC24U8000M640
	40	M6	8000	230	CC24U8000M640-230
	36	M6	8000	120	CC24U368000M6
	36	Tapped	8000	120	CC24U368000T
	42	M6	5000	120	CC24U425000M6
	42	Tapped	5000	120	CC24U425000T
	42	M6	8000	120	CC24U428000M6
	42	Tapped	8000	120	CC24U428000T
	31.5	M6	8000	230	CC24U8000631-230
42U	42	M6	5000	120	CC42U5000M6
	42	Tapped	5000	120	CC42U5000T
	40	M6	5000	230	CC42U5000M6-230
	40	Tapped	5000	230	CC42U5000T-230
	42	M6	8000	120	CC42U8000M6
	42	Tapped	8000	120	CC42U8000T
	40	M6	8000	230	CC42U8000M6-230
	40	Tapped	8000	230	CC42U8000T-230
	42	M6	12,000	120	CC42U12000M6
	42	Tapped	12,000	120	CC42U12000T
	40	M6	12,000	230	CC42U12000M6-230
	40	Tapped	12,000	230	CC42U12000T-230
	36	M6	5000	120	CC42U365000M6
	36	Tapped	5000	120	CC42U365000T
	36	M6	8000	120	CC42U368000M6
	36	Tapped	8000	120	CC42U368000T
	36	M6	12,000	120	CC42U3612000M6
	36	Tapped	12,000	120	CC42U3612000T
	42	M6	5000	120	CC42U425000M6
	42	Tapped	5000	120	CC42U425000T
	42	M6	8000	120	CC42U428000M6
	42	Tapped	8000	120	CC42U428000T
	42	M6	12,000	120	CC42U4212000M6
	42	Tapped	12,000	120	CC42U4212000T

Configure a cabinet to support your cooling needs.

Elite Cabinets and data center cooling.

The Elite Cabinet family from Black Box delivers more features and options than any other Black Box cabinet—more door and panel choices, more cable management, and dual universal PDU mounting brackets.

Plus, accessories like chimney tops, air-funnel kits, filler panels, and air dams allow Elite Cabinets to easily support your data center cooling strategy. Arrange them in cold aisle/hot aisle configurations. Use chimney tops to vent hot air back to the computer room air-conditioner (CRAC). Add the Cold Aisle Containment System kit to close off the aisle ends to contain cool air where it is needed.

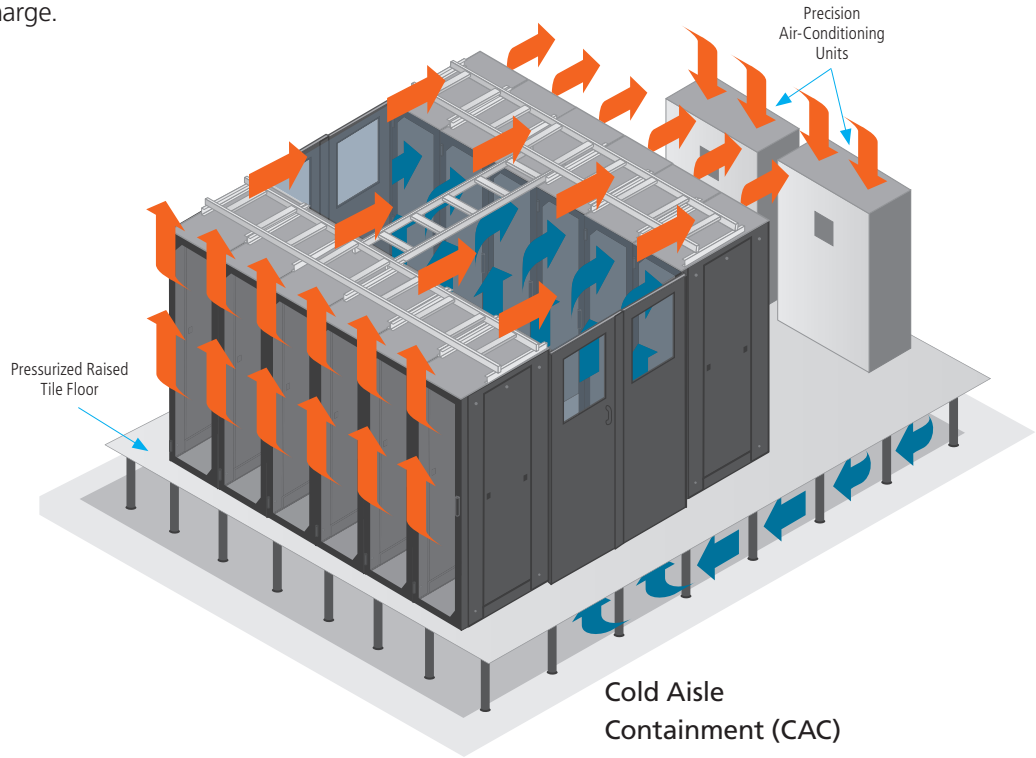
Select a preconfigured cabinet or have one customized to your specifications and shipped in only two business days. Choose from a wide range of sizes to suit all your data and server cabinet needs. Our Tech Support experts will help you specify the cabinet you need—FREE of charge.

Cold aisle containment.

Cold aisle containment (CAC) is another cooling method that increases cooling efficiency and reduces energy costs.

This cooling solution adds doors to the ends of the cold aisle and possibly a ceiling to minimize the mixing of the air, thus increasing cooling efficiency. The airflow barrier can range from makeshift arrangements of plastic strips to doors and ceilings made expressly for this purpose.

Because cold aisle containment concentrates cool air at the front of equipment where it's most needed, it's an exceptionally effective cooling method. Cold aisle containment significantly reduces energy usage, lowering power bills as well as reducing a data center's carbon footprint. In addition, it increases the available cooling capacity.



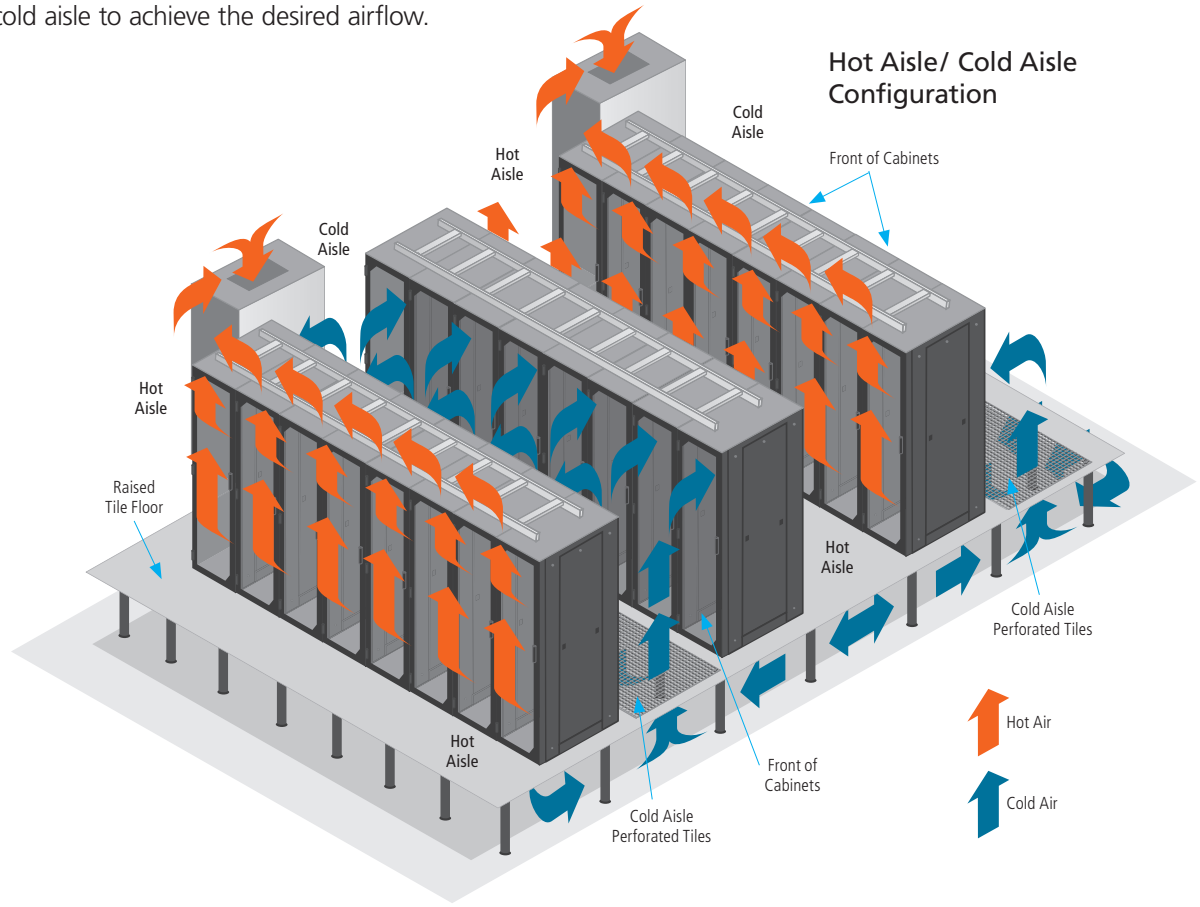
Cold Aisle
Containment (CAC)

Protect your IT investments
Environmental monitoring is a cost-effective, proactive way to protect your investments from climate, overheating, theft, etc. Find out more about AlertWerks™ at **blackbox.com/go/AlertWerks** or get FREE, live help in less than 30 seconds at **724-746-5500**.

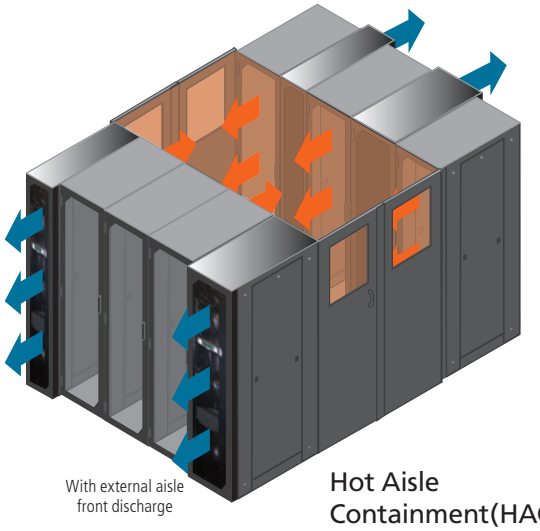
Hot aisle and cold aisle configurations.

Historically, this is the most common way to cool data centers, and is fairly simple. Cabinets are configured back to back and front to front so that aisles of cold air and hot air are created. This is typically done on a raised floor with perforated tiles in the cold aisle to achieve the desired airflow.

This arrangement works best for lower equipment densities and power loads less than 4 kW per enclosure. As more equipment is added, the solutions starts to become inefficient and other cooling methodologies need to be considered.



Hot Aisle/ Cold Aisle Configuration



Hot Aisle Containment(HAC)

Hot aisle containment.

Hot exhaust air from IT equipment is contained so that it doesn't mix with cool air. The front of IT equipment is accessed in the external cold aisle. Cold Row draws the contained hot air from the hot aisle, removes the heat, and supplies cooled air into the external cold aisle.

This method uses doors and other barriers like cold aisle containment does. However, in this configuration, hot air is captured and directed back to the CRAC unit. This method also prevents the mixing of hot and cold air, again increasing overall efficiency.

Further improving cooling efficiency.

Add a chimney to an Elite cabinet.

A chimney added to the top of a cabinet directs hot air into the plenum and to the CRAC. This prevents the hot and cold air from mixing as well as shortens the distance the exhaust air has to travel to the cooling unit.

Air distribution is critical.

Even if your data center is cool, the inside of a cabinet may overheat if air distribution is inadequate.

The temperature inside a cabinet is affected by many variables, including door perforations, cabinet size and location, and the types of components housed within the cabinet.

The most direct way to cool equipment is to ensure adequate airflow. The goal is to ensure that every server, every router, every switch has the necessary amount of air no matter how high or low it is in the cabinet.

It takes a certain volume of air to cool a device to within its ideal temperature range. Equipment manufacturers provide very little guidance about how to do this; however, there are some very basic methods you can use to maximize the ventilation within your cabinets. Most major server manufacturers recommend that the front and back cabinet doors have at least 63% open area for airflow. You can achieve this by either removing cabinet doors altogether or by buying cabinets that have mesh doors.

Because most servers, as well as other network devices, are equipped with internal fans, mesh doors may be the only ventilation you need as long as your data center has enough cooling to dissipate the heat load.

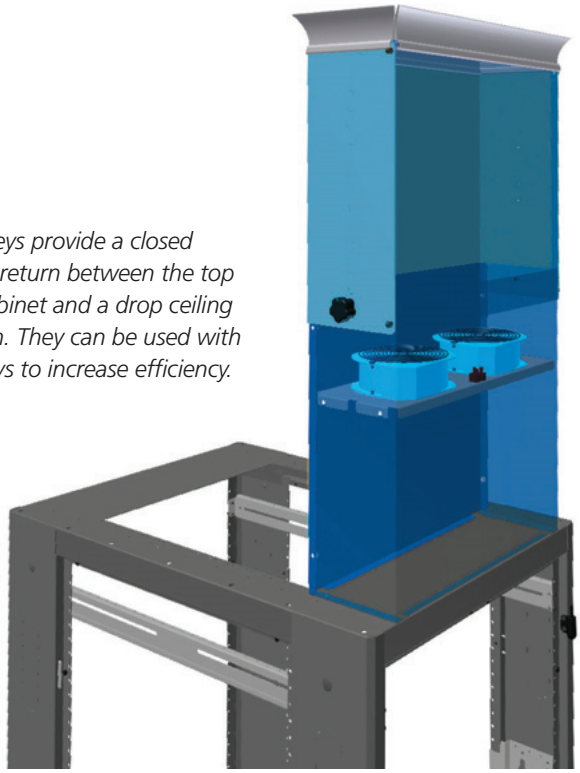
Side panels and other accessories also help to prevent the mixing of hot and cold air.

Equipment placement.

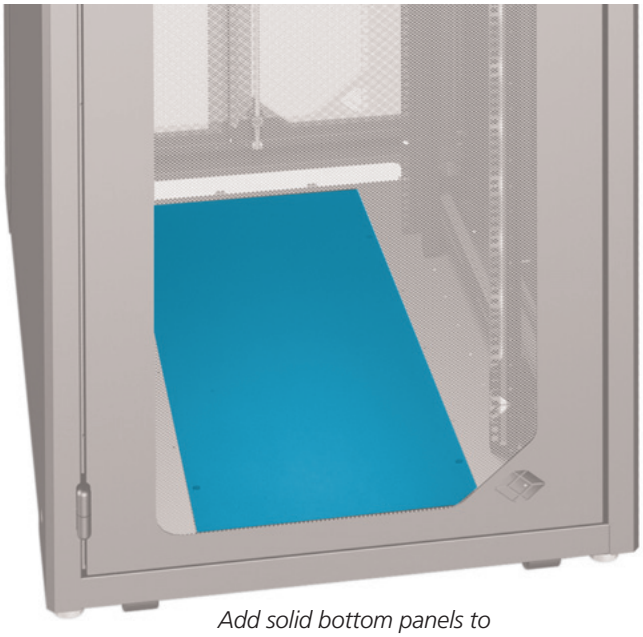
Don't overload the cabinet by trying to fit in too many servers—75 to 80% of capacity is about right. Maintain at least a 1.5" clearance between equipment and the front and back of the cabinet. And finally, ensure all unused rack space is closed off with filler panels to prevent recirculation of warm air.

Accessories

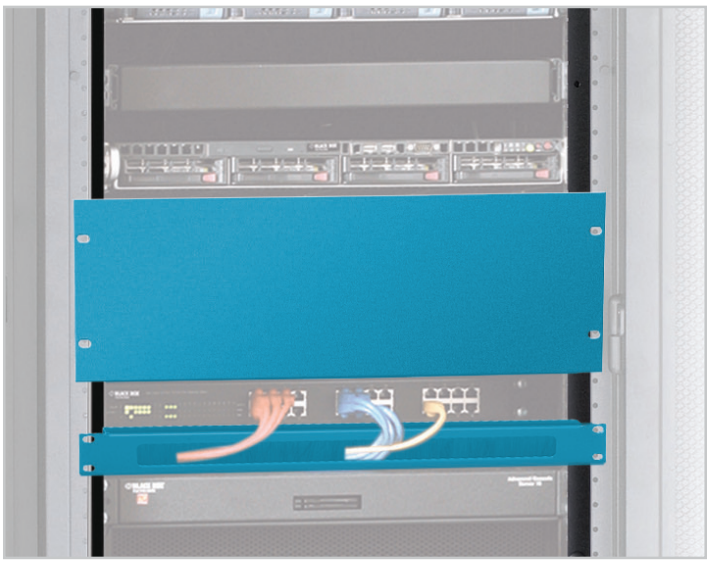
There are many accessories available to help improve the cooling efficiency of your cabinets.



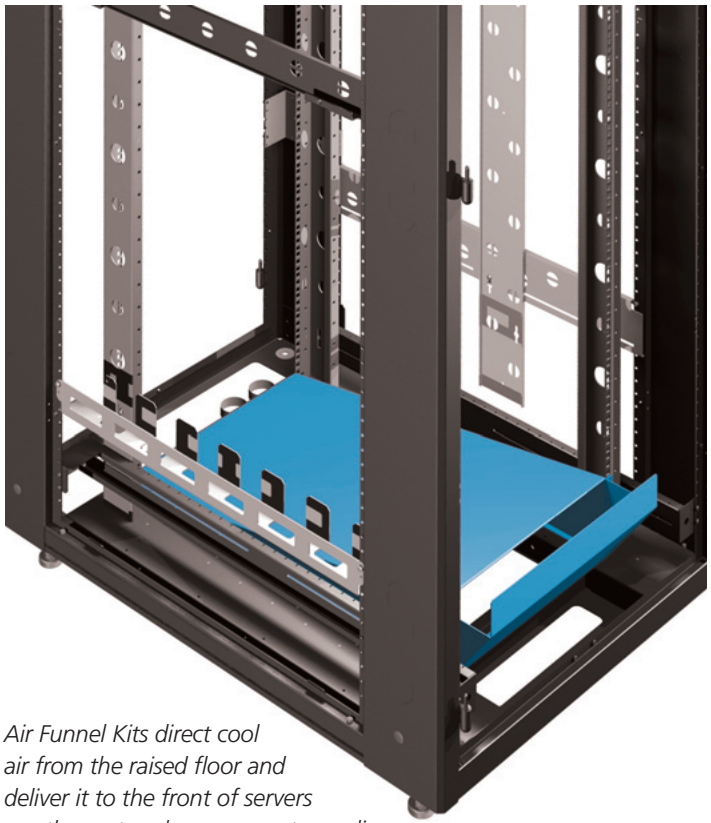
Chimneys provide a closed hot air return between the top of a cabinet and a drop ceiling plenum. They can be used with fan trays to increase efficiency.



Add solid bottom panels to your cabinet to keep cold air from escaping.



Filler Panels and Air Dams keep cool air in the front of the cabinet where it is needed by equipment. In addition, they keep warm air from escaping to the front of the cabinet.



Air Funnel Kits direct cool air from the raised floor and deliver it to the front of servers or other network components, cooling cabinet hot spots by 15° F, extending the life of servers, and minimizing downtime.

See all these accessories on **pages 20–21**.

Don't see exactly what you want? We'll build it for you in two days or less.

If one of our preconfigured cabinets doesn't work for you, it's easy to build your own Elite™ Cabinet to your specifications. Just use the codes (**right**) to fill in the line on the **bottom of the page**, matching colors as you go. When you're done, just call us at **724-746-5500** with the number, and we'll have your custom-built cabinets on your doorstep in a flash.

The example below is a 79"H (42U) x 30"W x 42"D cabinet with M6 rails, a mesh front door, a split mesh rear door, solid side panels, a mesh top, anti-tip legs, and keyed locks. Need help? Call our fast, FREE Tech Support at **724-746-5500**.

Example:

E	C	4	2	U	3	0	4	2	S	M	D	S	M	Y	K

Step 1:
Choose your enclosure.

48"H (24U) x 24"W x 42"D

E	C	2	4	U	2	4	4	2

48"H (24U) x 30"W x 32"D

E	C	2	4	U	3	0	3	2

72"H (38U) x 24"W x 32"D

E	C	3	8	U	2	4	3	2

72"H (38U) x 24"W x 36"D

E	C	3	8	U	2	4	3	6

72"H (38U) x 30"W x 32"D

E	C	3	8	U	3	0	3	2

72"H (38U) x 30"W x 36"D

E	C	3	8	U	3	0	3	6

79"H (42U) x 24"W x 42"D

E	C	4	2	U	2	4	4	2

79"H (42U) x 30"W x 42"D

E	C	4	2	U	3	0	4	2

84"H (45U) x 24"W x 36"D

E	C	4	5	U	2	4	3	6

84"H (45U) x 24"W x 42"D

E	C	4	5	U	2	4	4	2

84"H (45U) x 30"W x 32"D

E	C	4	5	U	3	0	3	2

84"H (45U) x 30"W x 36"D

E	C	4	5	U	3	0	3	6

84"H (45U) x 30"W x 42"D

E	C	4	5	U	3	0	4	2

84"H (45U) x 30"W x 48"D

E	C	4	5	U	3	0	4	8

Step 2:
Choose your rail type.

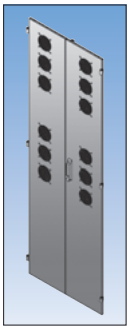
S — M6 rails with square holes

T — 10-32 tapped rails

Step 3:
Choose your front doors.

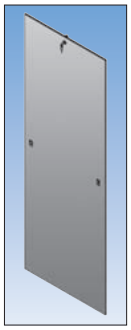
N — None
S — Solid
M — Mesh
D — Split Mesh
P — Plexi
F — Split Fan Door

Step 4:
Choose your rear doors.



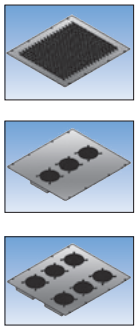
N — None
S — Solid
M — Mesh
D — Split Mesh
P — Plexi
F — Split Fan Door

Step 5:
Choose your side panels.



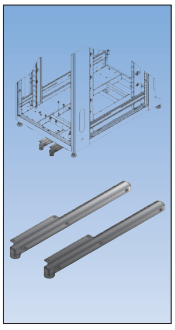
N — None
S — Solid
M — Mesh (Vented)

Step 6:
Choose your cabinet top.



N — None
S — Solid
M — Mesh
1 — 1-Fan Unit (10" Fan, 550-cfm)
2 — 2-Fan Unit (10" Fans, 1100-cfm)
3 — 3-Fan Unit (4" Fans, 225-cfm)
6 — 6-Fan Unit (4" Fans, 450-cfm)

Step 7:
Decide on anti-tip legs.



Y — Yes
N — No

Step 8:
Choose your lock*.

N — None
K — Keyed
C — Combination

Fill in the blocks below to get your ideal cabinet's SKU. For help configuring your cabinet, call our FREE Tech Support at **724-746-5500**.

* Doors have either a keyed or combination lock. Choose "None" when there is no door.

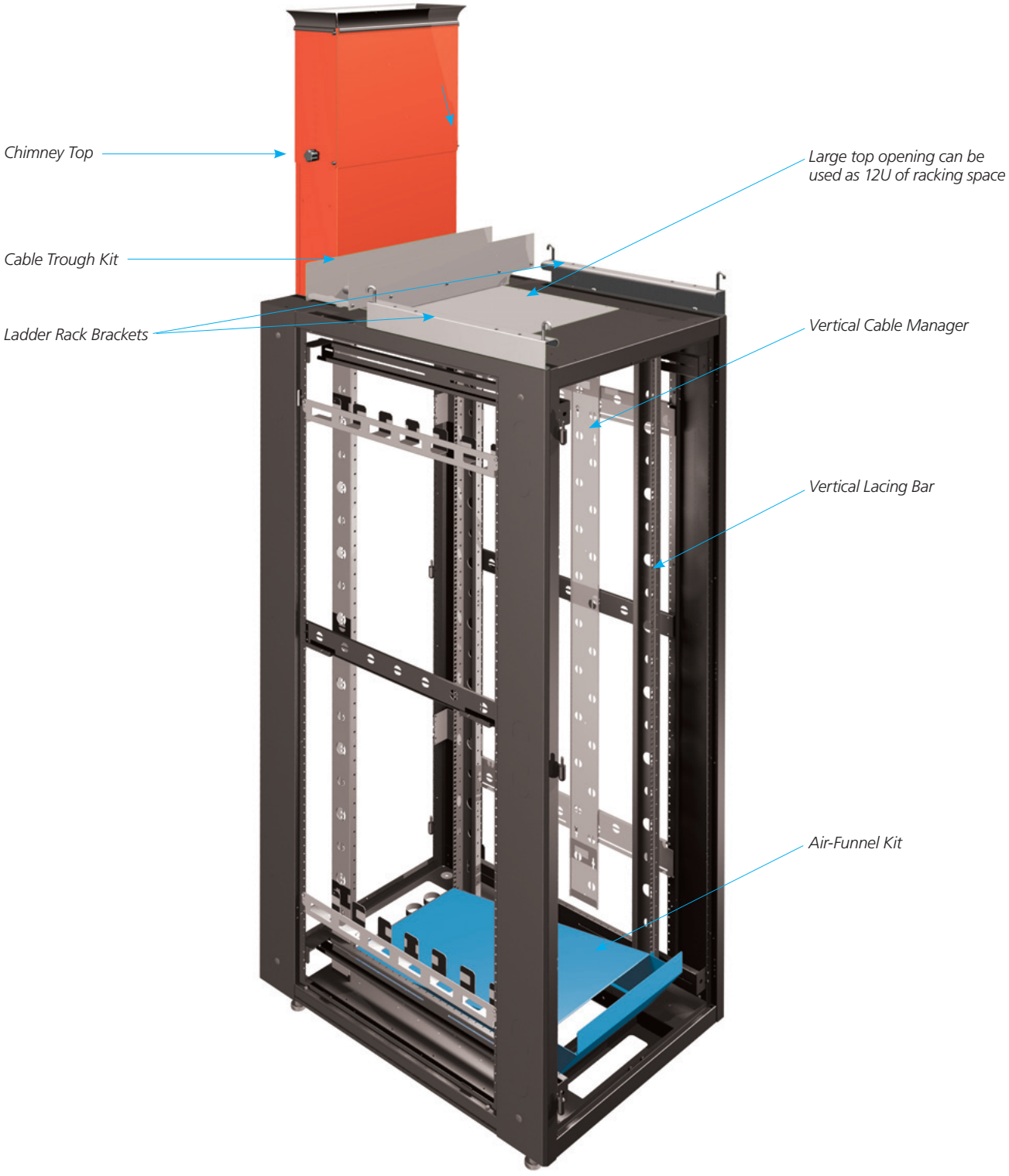
More features and options than any other Black Box cabinet.

Add accessories to add function.

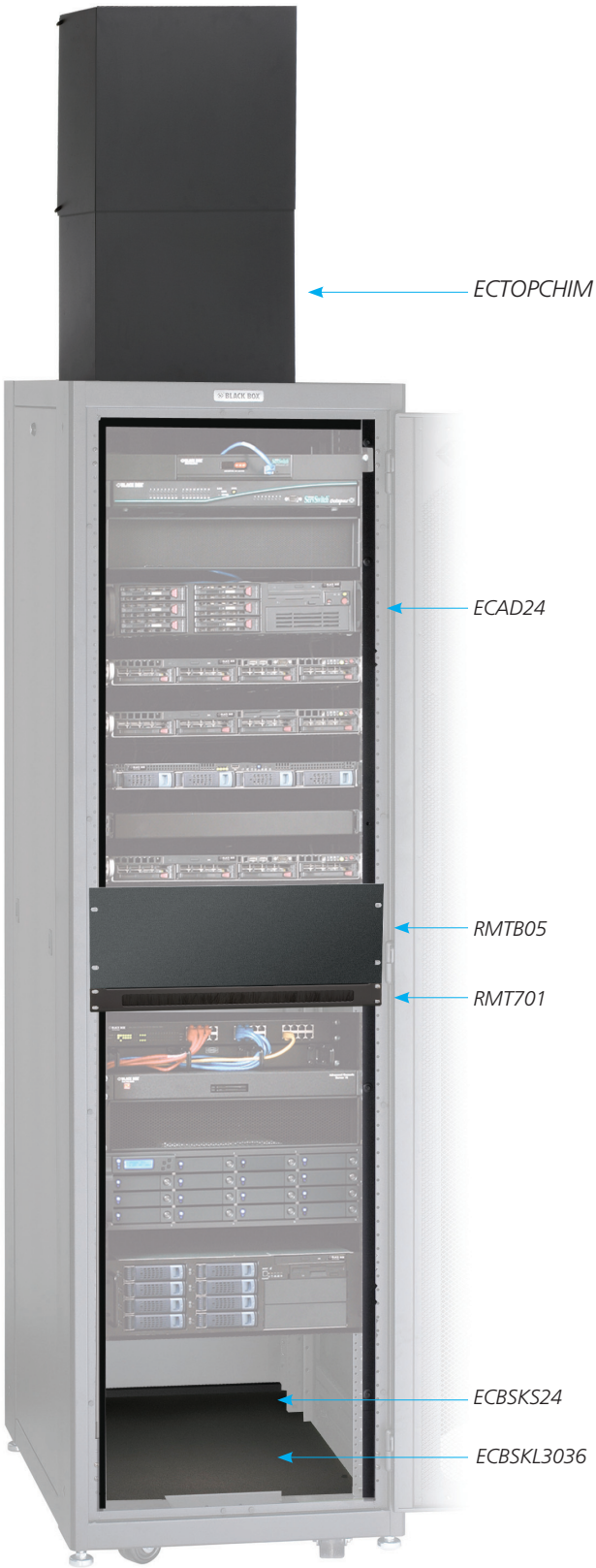
After you select the right cabinet configuration, it's time to outfit your cabinet with cooling accessories, cable management, keyboard trays, and all the parts that make your Elite™ Cabinet perfect for your application.

Change your cabinet configuration.

If you already own an Elite Cabinet, it's easy to change top panels and other parts when your requirements change—parts such as top panels can be changed in a just few minutes with basic tools.



Coolness for your cabinets—everything you need to improve cooling efficiency.



Chimney Top

- Provides a closed hot air return between the top of an Elite™ cabinet and a drop ceiling plenum.
- Includes a chimney for the Elite Cabinet small 3U top opening plus a solid panel to cover the large top opening.
- Chimney adjusts from 20" to 34".
- ✦✦ **WARRANTY** — Lifetime

Item	Code
Chimney Top	ECTOPCHIM
Fan Tray for Chimney	ECTOPCHIMFT

Air Dams

- Mount on the front rails of Elite Cabinets.
- Keep cool air in the front of the cabinet where it can be used by equipment.
- ✦✦ **WARRANTY** — Lifetime

Item	Code
Air Dams	
for 24" Wide 42U and 45U Cabinets	ECAD24
for 30" Wide 42U and 45U Cabinets	ECAD30
for 24" Wide 24U and 38U Cabinets	ECAD24S
for 30" Wide 24U and 38U Cabinets	ECAD30S

Filler Panels

- Keep cool air from dissipating before it reaches the top of the rack.
- Matte black finish.
- Mount easily to a 19" cabinet or rack with four included 10-32 screws.
- ✦✦ **WARRANTY** — Lifetime

RoHS — Yes

Item	Code
Filler Panels, Black	
1U (1.75")	RMTB01
2U (3.50")	RMTB02
3U (5.25")	RMTB03
4U (7.00")	RMTB04
5U (8.75")	RMTB05
6U (10.50")	RMTB06

Horizontal Cable Manager

- Use this brush-style cable manager with any 19" cabinet.
- Features a high-density nylon brush that provides a clean look while keeping dust out and preventing unwanted airflow.
- Heavy-duty steel construction.
- Includes mounting screws.
- ✦✦ **WARRANTY** — Lifetime

Item	Code
Horizontal Cable Manager, Brush Style, 1U	RMT701

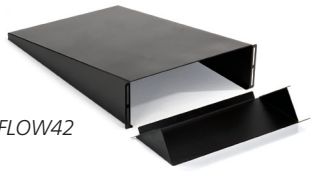
Solid Rear Bottom Panel

- Standard Elite™ Cabinets have rectangular cable cutouts at the bottom rear of the cabinet—this panel can cover that opening if you don't wish to use it for cable management.
- To cover the larger opening at the bottom of the cabinet, order Solid Bottom Panels (at **right**).
- ✦✦ **WARRANTY** — Lifetime

Item	Code
Solid Rear Bottom Panel	
24"W	ECBSKS24
30"W	ECBSKS30

Air Funnel Kits

- Cool cabinets by improving air circulation.
- Draw cool air from the bottom of the cabinet and deliver it right across the front of servers or other network components.
- Air distribution cools cabinet hot spots by 15° F, extending server life and minimizing downtime.
- Require only 2U of mounting space.
- Fit on standard 19" rails.



ECAIRFLOW42

Item	Code
Air Funnel Kits	
for 24"W x 36"D	ECAIRFLOW36
for 24"W x 42"D and 30"W x 42"D	ECAIRFLOW42
Air Funnel Kits with Dual Fan Tray	
for 24"W x 36"D	ECAIRFLOW2436FT
for 24"W x 42"D	ECAIRFLOW2442FT
for 30"W x 42"D	ECAIRFLOW3042FT

Solid Bottom Panel

- Standard Elite™ Cabinets are open on the bottom—this panel covers the large bottom opening.
- To cover the cable cutout, also on the bottom of the cabinet, order the Solid Rear Bottom Panel (at **left**).
- ✦✦ **WARRANTY** — Lifetime

Item	Code
Solid Bottom Panel	
24"W X 42"D	ECBSKL2442
30"W X 36"D	ECBSKL3036
30"W X 42"D	ECBSKL3042

Bottom Filter Kit

- Allows air circulation in Elite Cabinets.
- Filters out dust and other airborne debris.
- ✦✦ **WARRANTY** — Lifetime

ECBFKL3042

Item	Code
Bottom Filter Kit	
24"W X 42"D	ECBFKL2442
24"W X 36"D	ECBFKL2436
30"W X 32"D	ECBFKL3032
30"W X 36"D	ECBFKL3036
30"W X 42"D	ECBFKL3042

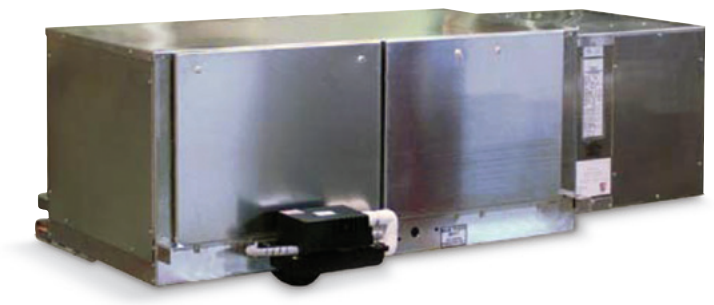
Cold Aisle Containment System

- Use this kit to shut off the aisle ends to contain cool air for cold aisle containment.
- Create more efficient cold or hot aisles by reducing air recirculation.
- Includes one pair of center-opening doors and all the parts you need for installation.
- ✦✦ **WARRANTY** — Lifetime

Item	Code
Cold Aisle Containment System	
42U	EC42U48WCD
45U	EC45U48WCD

Ceiling-Mounted Supplemental Air Conditioners

- Small-capacity precision cooling.
- 1–10 tons in eleven incremental sizes.
- DX and chilled water.
- Free-cooling or alternate water source.
- True self-contained systems.
- Split systems are available.
- Spot cooler and ducted configurations.
- All-aluminum cabinet construction.
- Reliable scroll compressor.
- Widest range of capacities and options.



Ceiling-mounted air-conditioning units provide temperature and/or humidity control for those hot spot areas in a building that exceed the central system's capacity.

They are an economical solution for applications such as when you carve out offices from an existing plant area, add another laboratory to a school, or install new medical equipment in a hospital.

The design of the ceiling ACs is the ultimate space saver. No floor space is required by the ceiling-mounted units. They easily mount in a standard 2' x 4' grid of a dropped ceiling plenum and are available with high-static blowers for connection to ceiling plenum ducts. They're especially useful where there is no floor or wall space available for cooling units or where aesthetics demand out-of-sight installation.

Ceiling-Mounted Supplemental Air Conditioners | Cooling Capacity

Net DX Cooling Capacity—BTU/H @ EAT = 80°F DB – 67°F WB, 50% RH											
	"OHS" Single Compressor Systems							"OHS" Dual Compressor Systems			
Air-Cooled DX											
Model	012-A-( )	018-A-( )	024-A-( )	032-A-( )	040-A-( )	048-A-( )	060-A-( )	048-DA	072-DA	84-DA	120-DA
Total	13,985	19,465	25,740	32,770	35,800	59,970	65,975	53,740	73,870	92,065	130,435
Sensible	10,585	15,235	19,470	23,430	27,950	47,685	52,435	40,860	62,110	71,070	98,030
Water-Cooled DX											
Model	012-W	018-W	024-W	032-W	040-W	048-W	060-W	048-DW	072-DW	84-DW	120-DW
Total	16,394	21,125	27,990	35,550	39,115	64,250	70,665	57,200	79,165	98,760	139,210
Sensible	11,675	16,000	20,455	24,575	29,500	49,240	54,100	42,320	63,770	73,735	101,715
Glycol-Cooled DX											
Model	012-G	018-G	024-G	032-G	040-G	048-G	060-G	048-DG	072-DG	84-DG	120-DG
Total	13,390	18,960	25,090	32,000	34,910	57,150	62,670	51,260	70,230	87,445	123,970
Sensible	10,435	15,060	19,160	23,085	27,500	46,565	51,120	39,730	61,010	69,465	95,280
Chilled Water System	"OHS" Chilled Water Systems (Net Cooling Capacity)										
Model	012-C	018-C	024-C	032-C	040-C)	048-C	060-C	072-C	084-C	120-C	—
Total	21,200	29,050	33,090	38,030	48,680	77,350	84,830	125,560	135,080	154,030	—
Sensible	14,560	20,520	23,770	27,430	36,100	56,410	62,390	87,010	94,600	112,150	—
GPM/(Pd. Ft.)	4.3 / (11.2)	5.8 / (19.8)	6.6 / (25.1)	7.6 / (13.6)	9.7 / (21.5)	15.5 / (10.7)	17.1 / (27.5)	25.2 / (27.5)	27.1 / (31.5)	31.0 / (10.7)	—

Ultrasonic Humidification

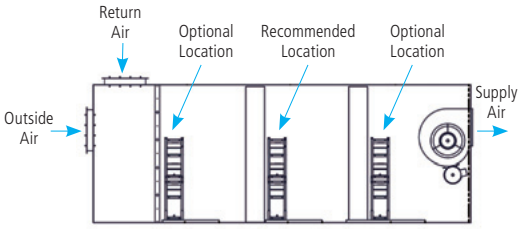
DRH Series—In the Room | From 4 to 18 lb./hr., Standalone Wall or Shelf Mounted

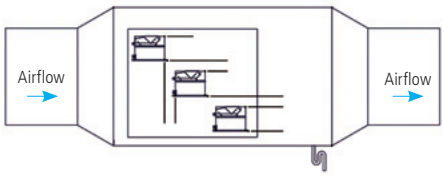
Model	Capacity (lb./hr.)	Power (W)	Weight (lb.)	Number of Nebulizer Units	Size (L)
DRH-04	4.4	145	19.8	4	14.2" (36.1 cm)
DRH-06	6.6	220	24.3	6	18.51" (47.0 cm)
DRH-08	8.8	285	30.9	8	22.83" (58.0 cm)
DRH-16	17.6	565	50.7	16	40.07" (101.8 cm)

Ultrasonic Humidifiers are designed for standalone direct room applications. DRH humidifiers are typically mounted on a wall or column or suspended below the ceiling, serving applications such as printing houses, lithographic printing processes, telephone exchanges, telecommunications rooms, electronics manufacturing, wood and textile processing, plus many more.

Advantages

- Maximum energy savings: Require 93% less electrical energy than electrode boilers or infrared humidifers.
- Clean humidification: Deionized water provides cleaner, mineral-free humidification.
- Redundancy by design: Each humidification module/transducer is independently wired.
- Very fine mist: A mist of approximately 1 micron diameter is quickly absorbed into the air stream.
- Reduced air-conditioning requirements: Uses an adiabatic constant (enthalpy) humidifying process, which reduces air temperatures and reduces the air-conditioning cooling load.
- Fast ROI period: Energy analysis calculations show that, because of lower electrical energy and water usage and reduced compressor operating hours, ROIs of less than one year are common.





For technical specifications, turn the page.

Low-Density, Floor-Mounted Precision Air Conditioners

- From 1 to 7 tons.
- DX—air-, water- or glycol-cooled.
- 24 x 7 mission-critical operation.
- Chilled water.
- Compact footprint.
- Front service access.
- Upflow and downflow air patterns.
- High-efficiency return air filtration.
- Microprocessor control.
- BMS data communication capability.
- Main power disconnect.

Microprocessor Controls

The advanced microprocessor-based controller continually monitors outside air conditions and maintains proper compressor and reheat operation, using Black Box's unique control method.

Steam Humidification

The electrode steam canister humidifier is available with all systems. Manually adjusted on/off and optional proportional steam humidifiers are available.

High Efficiency/Quiet Operation

Low sound power scroll compressors coupled with low RPM blower design and acoustically lined cabinets provide the optimum in quiet operation.

Mini-Space DX & DW | Specifications

CCU/D Model	CC ( )-41-( )	CC ( )-61-( )	CC ( )-81-( )	CC ( )-121-( )	CC ( )-171-( )	CC ( )-201-( )
Net DX Cooling Capacity—BTU/H, (includes standard DX evaporator motor heat @ std CFM & e.s.p. ratings) 75° F DB – 62.5° F WB, 50% RH						
Air-Cooled DX						
Total	17,500	24,020	31,960	41,510	47,490	64,180
Sensible	15,900	21,080	22,460	36,920	47,490	64,180
Water-Cooled DX						
Total	18,800	26,430	35,270	45,220	52,940	71,930
Sensible	16,900	21,070	22,770	36,500	52,940	69,110
Glycol-Cooled DX						
Total	16,900	23,290	30,980	39,630	46,630	61,950
Sensible	15,400	20,310	22,590	35,430	46,630	61,950
Chilled Water System						
Total	32,990	—	—	—	—	86,700
Sensible	32,990	—	—	—	—	81,540
GPM (psi)	6.6 (2.6)	—	—	—	—	17.2 (4.9)

CCU/D Model	CCU/D-41-W	CCU/D-61-W	CCU/D-81-W	CCU/D-121-W)	CCU/D-171-W	CCU/D-201-W	CCU/D-110-CW	CCU/D-200-W
Reheat/Heat—Performance capacities include evaporator blower.								
Electric Reheat/Heat—Standard								
Nominal kW (Stages)	2 (1)	2 (1)	2 (1)	4 (2)	12 (2)	12 (2)	4 (1)	12 (2)
Total BTU/H (kW) w/Motor Heat	8730 (2.6)	8730 (2.6)	8730 (2.6)	15,560 (4.6)	48,580 (14.2)	48,580 (14.2)	15,560 (4.6)	48,580 (14.2)
Humidification—Electrode Steam Canister Humidifier with Adjustable Output (Standard)								
lb./hr. (kW Input)	2–5, (1.7)	2–5, (1.7)	2–5, (1.7)	2–5, (1.7)	4–10 (3.4)	4–10 (3.4)	2–5, (1.7)	4–10 (3.4)
Standard Control	Cycling	Cycling	Cycling	Cycling	Cycling	Cycling	Cycling	Cycling
Evaporator Blower/Motor								
Horsepower	¾	¾	¾	¾	3.0	3.0	¾	3.0
Cfm @ Ext. St. Press.	1180 @ 0.2"	1180 @ 0.2"	1180 @ 0.2"	1180 @ 0.2"	3450@ 0.3"	4130 @ 0.3"	1890 @ 0.2"	41300 @ 0.3"
Drive Method	Direct	Direct	Direct	Direct	Belt	Belt	Direct	Belt
Evaporator or CW Coil—Aluminum Fin, Copper Tube								
Rows/Face Area ($ft.^2$)	4 (3.25)	4 (3.25)	4 (3.25)	4 (3.25)	4 (8.3)	4 (8.3)	4 (3.25)	4 (8.3)
Face Velocity (fpm)	363	363	363	581	415	498	581	498
Control Valve, Size (Cv)	—	—	—	—	—	—	½" (4.0)	¾" (7.5)
Standard Valve Type	—	—	—	—	—	—	3-Way, 300 PSIG, Modulating	
Physical Data								
Size	73"H x 24"W x 24"D (185 x 61 x 61 cm)				73"H x 39"W x 32"D (185 x 99 x 81 cm)		73"H x 24"W x 24"D (185 x 61 x 61 cm)	73"H x 39"W x 32"D (185 x 99 x 81 cm)

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